Delaware's economy has long been a source of innovation and technological growth. Some of the state's most prominent firms, such as E. I. du Pont de Nemours and Company, AstraZeneca and W. L. Gore and Associates, are world renowned for their technical breakthroughs and resulting commercial success. Because of the presence of these firms and others like them, as well as our highly capable research universities, Delaware has the second highest concentration of scientists and engineers in the United States. In addition, Delaware is ranked among the top 5 states in the nation when it comes to the number of patents issued per 100,000. This high quality workforce and innovative research and development environment provide excellent opportunities for technology-based business growth. The State of Delaware also provides a variety of technology resource programs to foster commercialization and growth in high technology.

Section Title **Page**

CENTER OF RESEARCH AND DEVELOPMENT ACTIVITY:

Examples of firms conducting research and development activities in Delaware follow:

E. I. du Pont de Nemours and Company

The DuPont Company has four major research and development facilities in the Delaware Valley that serve the following research areas: fibers, polymers, agricultural products, industrial and specialty chemicals, electronics, and toxicology. The DuPont research effort encompasses support of existing products and processes, the discovery and development of new products, processes and businesses, and fundamental research. A large portion of the company's worldwide research staff is employed in Delaware.

Hercules Incorporated

Hercules conducts its major research and development projects at its Research Center near Wilmington. Efforts are targeted at fundamental studies in chemistry and engineering, applied research on new products, development of pilot plant processes, the improvement of manufacturing techniques for existing product lines, and the identification and development of new technologies for the corporation.

Uniqema

Uniqema, a business unit of ICI Americas Inc., conducts chemical research and development activities at two sites in New Castle, Delaware. Applications Research, Technical Service Labs and the Technical Innovation Center are located in New Castle, Delaware and are adjacent to its North American manufacturing plant. These facilities help to support Uniqema's global activities in the Personal Care, Lubricants, Polymers, Oilfield, Specialty Cleaning, Fibers and Crop Protection industries. Research activities are closely coordinated with the company's worldwide research program.

Basell Polyolefins

Basell Polyolefins is the world's largest producer of polypropylene and a leading supplier of polyethylene and advanced polyolefin products. Formed in October 2000 and owned by BASF and Shell, Basell creates polyolefin materials and technology that enhance quality of life and convenience. The company's corporate headquarters is located in The Netherlands, near Amsterdam. Basell has regional offices in Wilmington, Delaware; Mainz, Germany; Sao Paulo, Brazil, and Hong Kong. The company's North America-based research and development / technical centres are located in Marshallton, Delaware; Elkton, Maryland, and Lansing, Michigan.

W. L. Gore and Associates, Incorporated

W. L. Gore & Associates, Inc. is an international manufacturing firm with corporate headquarters and manufacturing facilities in Newark. Major developments in electronic, industrial, fabric, and medical product areas followed Dr. Robert W. Gore's 1969 discovery of a way to stretch polytetrafluoroethylene (PTFE, a polymer familiar to consumers as DuPont's "Teflon") to produce GORE-TEX® materials in many forms and shapes. GORE-TEX® expanded PTFE is now used in outerwear, high performance fibers, industrial filtration systems, dental floss, vascular grafts and electronic cables, in addition to many other uses.

CENTER OF RESEARCH AND DEVELOPMENT ACTIVITY (continued):

W. L. Gore and Associates, Incorporated

The company is heavily committed to research and development, resulting in a continually broadening range of products. Gore's unique corporate culture, termed the "lattice structure," stresses freedom, fairness, commitment and good judgment in an open and creative work environment. Associates have no titles, communicate directly with one another, and work closely together in teams and task forces. Gore Associates believe this unique culture enables the company to respond quickly to changing market developments and has been a key element in the company's success and growth.

AstraZeneca

AstraZeneca's United States headquarters in Fairfax, just north of Wilmington, includes bioscience and pharmaceuticals research and development laboratories. The pharmaceuticals research and development center incorporates some of the most advanced pharmaceutical research equipment and technology available today. AstraZeneca's research activities in Wilmington are closely coordinated with AstraZeneca's global research program.

University of Delaware

The University of Delaware's outstanding reputation for research in cooperation with industry extends through a wide range of areas. The breadth and depth of the University's research efforts are indicated by its experience as a partner with industry in such areas as composite materials; information science, natural science, with emphasis on biotechnology; energy, with particular excellence in photovoltaics; virology and development of genetically engineered vaccines; and agrigenetics, including plant tissue culture research. The Delaware Research Partnership, a fund established at the University by the State in 1984 and expanded annually, provides matching monies for new technological investigations with industry. Through its seven colleges, institutes and various centers, including the Center for Composite Materials, Center for Catalytic Science and Technology, Center for Climatic Research and others, the University has helped foster growth and development in the chemical, computer, energy, food, agricultural and marine sciences industries. The University's Institute of Energy Conversion, one of the world's largest thin-film solar cell laboratories performing research and process development for industry, has been designated by the Department of Energy as a national center of excellence in photovoltaic research and education. The University of Delaware's Center for Composite Materials is one of three partners in an Army Research Laboratory Materials Center of Excellence. The University is also involved with the Delaware Technology Park in Newark.

TECHNOLOGY RESOURCES:

- **The Delaware Biotechnology Institute**
  Dr. David Weir, Director
  (302) 831-4888
  http://www.dbi.udel.edu

The Delaware Biotechnology Institute (DBI) at the University of Delaware in Newark, Delaware, is a partnership among government, academia and industry to help establish the First State as a center of excellence in biotechnology and the life sciences. The Institute's mission is to build a biotechnology network of people and facilities to enhance academic and private sector research, catalyze unique cross-disciplinary research and education initiatives, and to foster the entrepreneurship that creates high-quality jobs. Located within the Delaware Technology Park, the Institute's new 72,000 square foot research facility is designed to house 170 faculty and student researchers, and features 38 laboratories, six state-of-the-art research instrumentation centers, and several large and small conference areas.

Leading-edge interdisciplinary research is at the core of DBI's work. Successful partnerships are already underway involving biology, biochemistry, engineering, marine, materials science and computational biology. Encompassing 12 academic departments at the University of Delaware alone, collaborations are also national, international, and state-wide, with the participation of scientists from Delaware State University, Delaware Technical & Community College, and Wesley College. DBI-affiliated researchers are principal investigators on a growing portfolio of federal research grants from NSF, NIH, USDA and numerous other government agencies and private foundations.

Research at the Institute is supported by state-of-the-art instrumentation, including nuclear magnetic resonance, mass spectroscopy, DNA and protein sequencing, and powerful microscopy all linked to a bioinformatics center designed to store and analyze the massive amounts of data generated by interdisciplinary research initiatives.

- **University of Delaware Center for Catalytic Science & Technology**
  Jingguang G. Chen, Director and Associate Professor of Materials Science, Engineering & Chemical Engineering
  (302) 831-0642, or chenj@che.udel.edu
  www.che.udel.edu/faculty/full/chen

Recognizing the central role of catalysis in industrial practice, the Center for Catalytic Science & Technology (CCST) was founded at the University of Delaware in 1978. The hallmark of the Center's research continues to be its strong connection to industrial practice. These ties have been forged through a number of mechanisms, including the Center's Industrial Sponsors Program, industrially supported grant and contract research, collaborative projects with industrial scientists and engineers, industrial sabbaticals, and exchanges of research personnel.

- **Applied Optics Center of Delaware, Inc.**
  Dr. Nourredine Melikechi, Delaware State University, Technical Director,
  (302) 857-6656 or (302) 857-6806 or melik@dsc.edu.
  www.dsc.edu/aoc

TECHNOLOGY RESOURCES (continued):

The Applied Optics Center of Delaware focuses on developing and commercializing different applications of new laser technology. The Center concentrates on laser spectroscopy technology and laser diode based devices. Core competencies include time and frequency-based laser spectroscopy, and nonlinear and laser optics. Dade Behring, a major instruments maker whose research and development headquarters are located in Glasgow, Delaware, is the major industrial sponsor. Research with Dade includes enhanced detection of trace atoms and molecules in liquids and a laser-based spectrometer for various medical applications. The American Dental Association projection includes laser curing of photo-polymers. With NASA, the Center is measuring the greenhouse gas emissions by generating ultra-violet pulses through laser amplification. The products to be commercialized by the Center represent potential job growth in Delaware through these emerging companies and new spin-off ventures. The Center's research will be conducted at Delaware State University, another other major Center partner.

- **Fraunhofer USA – Center for Molecular Biotechnology**
  Dr. Barry Marrs, Executive Director, (302) 369-3635, or bmarrs@fraunhofer.org
  Dr. Vidali Yusibov, Scientific Director, (302) 369-3766, or vyusibov@fraunhofer.org
  http://www.fraunhofer-cmb.org

The Fraunhofer USA – CMB, a division of the renowned German research organization Fraunhofer-Gesellschaft, brings an international dimension to the state. CMB has developed a suite of new technologies, including engineered plant viruses for producing veterinary and human vaccines, therapeutic proteins, antibodies and industrial enzymes in plants. Many of the current programs at the Center for Molecular Biotechnology are focused on the development of vaccines and therapeutic proteins, including those for protection from bio-warfare agents.

The technological advances at the Center are gaining broader recognition and major funding was recently received from the Department of Defense to develop additional vaccine candidates against bio-agents. Led by Senator Joe Biden, the Delaware congressional delegation teamed up to win a $3.5 million appropriation for CMB to do this work.

Clients benefit from access to the entire network of German institutes and USA centers. Fraunhofer-Gesellschaft, with headquarters in Munich, Germany, is Europe's largest organization for application-focused contract research and development, with 13,000 employees worldwide. CMB is located in Newark, Delaware and is affiliated with the Fraunhofer Institute for Molecular Biology and Applied Ecology in Aachen and Schmallenberg, Germany.

As part of its commitment to the growth of business and technology in the State, Fraunhofer CMB pursues partnerships with the State's main academic institutions - the University of Delaware, Delaware Technical and Community College, and Delaware State University. It is interested in teaming with both academia and industry to form strategic partnerships for federal research and development project funding.

Fraunhofer USA provides exchange opportunities for professors and students between Germany and the USA, as well as wide-ranging opportunities and assistance for technical and educational growth.

TECHNOLOGY RESOURCES (continued):

- **University of Delaware Office of the Vice Provost for Research (OVPR)**
  Richard D. Holsten, Ph.D., Associate Provost for Research, (302) 831-2383

The Office of the Vice Provost for Research (OVPR) is responsible for managing the intellectual property of the University of Delaware. In this capacity, OVPR catalyzes technology transfer and commercialization initiatives through interactions with all entities interested in University of Delaware technologies. This includes networking UD research expertise and researchers, patenting and licensing, and serving as a central point of contact for inquiries from industry.

- **University of Delaware E-Commerce Certificate Program**
  Baerbel Schumacher, Program Manager
  (302) 831-4036, or baerbel@udel.edu
  http://www.continuingstudies.udel.edu/it/ecomm/index.shtml

In today's business world, management, development, and integration of e-business applications are impacting every kind of enterprise from large to small businesses, non-profit organization, educational institutions, and government entities. The University of Delaware's E-Commerce (EC) Certificate meets the requirements of busy professionals who need to stay abreast of major changes that are generating new business, in some cases leading to major restructuring of key industries. The EC Certificate also meets the needs of those who seek to become creative leaders of change in building and implementing consumer-oriented applications of electronic media for commerce, information and distribution, and customer service. Courses are available online and in the classroom. A concentration in Business Analysis and Project Management is also available.

- **Deltech IT Learning Center**
  Allen Alexander, Chair, IT Learning Center, (302) 573-5453

The mission of The IT Learning Center is to provide advanced IT training to professionals that is convenient and affordable. Seminars and courses cover the latest IT technology and are designed to enable IT professionals to update and extend their skill set. Courses are taught by IT professionals from local businesses. The Center offers competitive group and individual rates, evening and weekend courses, and customized training.

- **Digital Delaware**
  Mike Bowman, Chairman, (302) 452-1123
  www.digidelaware.com

Digital Delaware is a non-profit organization with a mission to unite technology leaders throughout the Delaware Valley in a friendly, productive environment where they can share knowledge and help each other grow.

Digital Delaware hosts monthly events featuring an educational program and networking. There is no fee to attend the programs which attract between 150-200 decision-makers.

- **Center for Composite Materials at the University of Delaware**
  Dr. John W. Gillespie, Director, (302) 831-8702, or jack_gillespie@ccm.udel.edu
  www.ccm.udel.edu

TECHNOLOGY RESOURCES (continued):

Founded in 1974, the University of Delaware Center for Composite Materials is dedicated to advancing composite technology through lower cost, higher quality and reduced risk. This Center educates engineers, performs research and provides prompt technology transfer to the business community. Students come from across the nation and around the world to earn degrees in engineering, materials science physics, business or chemistry. More than 25 faculty members, 40 research staff, 60 undergraduate and graduate students and 10 support staff are currently affiliated with CCM.

The Delaware Economic Development Office produces and distributes a directory of Delaware's bioscience companies to enhance interaction among existing companies, attract new companies, and provide information to potential investors. The directory is available in hard-copy or electronically at www.state.de.us/dedo. Bioscience companies who are interested in having their information listed for free can contact Loretta English.

DIRECT TECHNICAL ASSISTANCE:

- **Delaware Manufacturing Extension Partnership**
  Steve Quindlen, Executive Director, (302) 283-3131, or squindlen@demep.org
  www.demep.org

The Delaware Manufacturing Extension Partnership (DEMEP) is a statewide, nonprofit extension center that provides hands-on technical and business assistance and referrals to Delaware's small and medium-sized manufacturers. DEMEP's expert staff of trained field agents works to improve the quality, productivity and profitability of Delaware manufacturers by helping them adopt world-class manufacturing technologies and techniques. DEMEP receives state and federal support and is part of a national network of manufacturing extension centers under the National Institute of Standards and Technology. DEMEP operates as a partnership with the Delaware Economic Development Office, the Delaware State Chamber and Delaware Technical and Community College.

DIRECT TECHNICAL ASSISTANCE (continued):

- **Small Business Development Centers**
  Clinton Tymes, State Director, (302) 831-1555
  www.delawaresbdc.org

The Delaware Small Business Development Center provides free one-on-one confidential business advice, training, education, information and research to Delaware's small businesses and potential entrepreneurs. Specialty programs include:

- **Government Marketing Assistance Program** - helps businesses locate and bid on government contracts.
- **Delaware Technology Assistance Program** - assists technology business with their specialized needs.
- **Family Business Center** - a membership based organization dedicated to supporting the unique needs of family controlled businesses.

- **Delaware Technology Assistance Program (DETAP)**
  Barry Williams, (302) 831-1555 or www.delawaresbdc.org

The DETAP serves as the centralized source for information and assistance for Delaware's technology-based business community. Examples of DETAP services include:

- SBIR/STTR Proposals
- Innovation Assessment
- Preliminary Patent Searches
- Assistance in locating and applying for non-traditional financing
- Market Research
- Technology Transfer